



Infectious sacroiliitis caused by *Staphylococcus aureus* following acupuncture: a case report

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ABSTRACT

Determination of the origin of infectious sacroiliitis (ISI), a rare form of septic arthritis, is often time consuming and clinically difficult owing to its various presentations, which include joint, skin and urinary tract infections. This report describes the diagnosis, determination of infectious origin and treatment of a case of ISI attributed to the use of acupuncture for the treatment of lower back pain. We report on a 61-year-old man who developed right hip pain and fever 3 days after undergoing acupuncture over the right buttock region for the treatment of lower back pain. Blood culture showed infection with methicillin-susceptible *Staphylococcus aureus* and MRI disclosed the presence of an inflamed area over the right iliac bone and the right portion of the sacrum. The patient was cured after a 4-week course of antimicrobial treatment. Clinicians should take a history of acupuncture use when evaluating patients presenting with fever of unknown origin and/or bacteraemia and consider the possibility of ISI when evaluating patients with hip pain and infectious signs after acupuncture or other possible causes of infection. This indicates the importance of performing clinically clean procedures to prevent septic complications when treating patients with acupuncture.

INTRODUCTION

Infectious sacroiliitis (ISI) or septic arthritis of the sacroiliac joint is a relatively rare disorder, affecting between 1% and 2% of all patients with septic arthritis.¹ Among the most common symptoms described by patients are lower back, lumbogluteal, abdominal, hip and/or posterior thigh pain, together with difficulty in moving on the affected side. One study of 39 patients found that lumbogluteal pain was the most frequently reported symptom at presentation (36 cases).¹ As

these symptoms are also associated with sciatica, degenerative disc disease and spondylodiscitis, their presence may result in misdiagnosis.

This case report describes a patient who developed *Staphylococcus aureus*-related ISI after receiving acupuncture for the treatment of lower back pain. This report describes the possible role of acupuncture in the development of soft tissue infection and thus the importance of taking a history of acupuncture use when evaluating patients presenting with signs of infection and/or bacteraemia.

CASE REPORT

A 61-year-old Taiwanese man was admitted to the Tri-Service General Hospital for low-grade fever and right hip pain for 1 week. The patient had had no major health problems until 3 weeks earlier, when he had fallen while travelling in China. He was treated at a local hospital, which found a laceration wound on his forehead but a CT scan of the brain showed no intracranial haemorrhage. His wound was closed, and he was discharged. Initially, he felt quite well, but his lower back pain gradually worsened. He had several sessions of acupuncture to treat this pain, with needles inserted into acupuncture points around his right buttock, referred to as the *ah shi* point.

Although his back pain improved with this treatment, 3 days later he began again to experience right hip pain and fever, for which he was admitted to the Tri-Service General Hospital in Taiwan. On admission, his body temperature was 38.0°C, pulse rate 98 beats/min, respiratory rate 18 breaths/min and blood pressure 127/79 mm Hg. His level of pain, as measured by the pain Visual Analogue

Scale (VAS; range 0–10, with 0 being no pain and 10 the greatest pain possible) was 8. Physical examination disclosed tenderness over the right hip and limitation of movement, especially during flexion and inability to abduct. Laboratory investigations showed a white blood cell count of $5.93 \times 10^9/L$ (normal value 4.40×10^9 – $11.00 \times 10^9/L$), haemoglobin 9.9 g/dL and platelet count $295 \times 10^9/L$ (normal value 150×10^9 – $400 \times 10^9/L$). Although his serum C-reactive protein level was abnormally high at 9.39 mg/dL (normal value <0.50 mg/dL), the results of his liver and renal function tests were within normal ranges. Based on review of these results, intravenous cefazolin was given (1.0 g every 8 h) after blood culture.

On the third day of admission, a blood culture yielded Gram-positive cocci, which were later identified as methicillin-susceptible *S aureus*. Intravenous cefazolin was then stopped and oxacillin started (2.0 g every 4 h). MRI of the right hip region showed joint space widening, cortical erosion and synovial thickening of the right sacroiliac joint (figure 1); adjacent bone marrow oedema, overlying soft tissue swelling and increased effusion in the joint (figure 2). It also showed a subcutaneous fibrogranulation tract at the right gluteal region corresponding to the acupuncture-insertion tract (figure 3). The clinical presentations and MRI confirmed the diagnosis of ISI caused by *S aureus* secondary to acupuncture. After 14 days of intravenous oxacillin, followed by 14 days of oral ciprofloxacin and rifampicin, the patient was cured without any sequelae, and was discharged.

DISCUSSION

ISI is a rare disease. A French multicentre study showed that only 39 patients within 17 years were diagnosed in eight hospitals, indicating that only about one patient in each hospital had been diagnosed with ISI every 4 years.¹ Although the presence of fever and a positive blood culture indicate the infectious origin of

ISI, diagnosis is time consuming and clinically difficult in many cases owing to its various presentations. Risk factors for ISI include a previous history of joint, skin or urinary tract infection; injury or trauma; endocarditis; pregnancy and intravenous drug abuse.^{1–3} Involvement of the sacroiliac joint in the infection is always unilateral and tends to occur on the left side (60% of cases).¹ In our patient, the ISI corresponded to an acupuncture needle insertion site (*ah shi* point), and might have been caused by poor acupuncture technique, including inadequate skin preparation. The high intensity of the patient's pain on presentation, which was 8 on the VAS, accorded with the findings of a previous study of ISI, in which the mean VAS was 7.3.¹ Consideration of the high intensity of the pain with which patients with ISI present may help physicians differentiate the disease from muscular pain, disk disease or intra-abdominal disease.

In East Asia, acupuncture is a common and increasingly popular treatment of chronic pain, considered to be relatively safe.⁴ Few serious adverse events have been associated with this treatment, with those occurring mostly related to either a lack of adequate anatomical knowledge or failure to use proper precautions against infection. Cases of acupuncture-associated septic arthritis have been reported, most of which presented at the knee,⁵ but only one case of ISI secondary to acupuncture has been described.⁶ Unfortunately, the report identified neither the causative organism nor the acupuncture site, unlike our case, for which methicillin-susceptible *S aureus* and acupuncture over the *ah shi* point for lower back pain could be identified as the cause of ISI.

Diagnosis is based on the evaluation of clinical history or a physical examination indicative of infection, radiographic localisation and positive culture from blood or joint aspirate.⁷ There is a specific blood test for diagnosing ISI. A leucocyte count has not been found to be a sensitive marker of ISI, but the

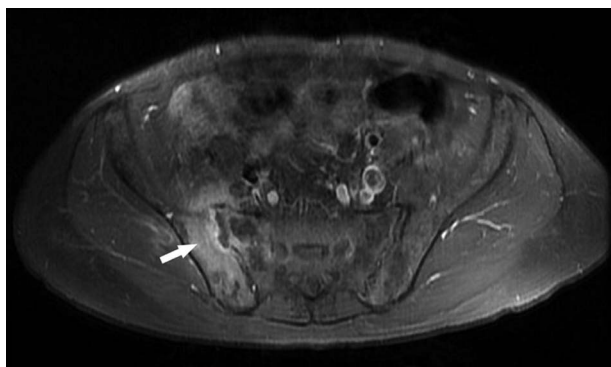


Figure 1 Axial fat-suppressed T1-weighted MRI of the right hip showed increased effusion with anterior capsular bulging, joint space widening, cortical erosion and synovial thickening (arrow) at the inferior portion of the right sacroiliac joint after contrast enhancement.

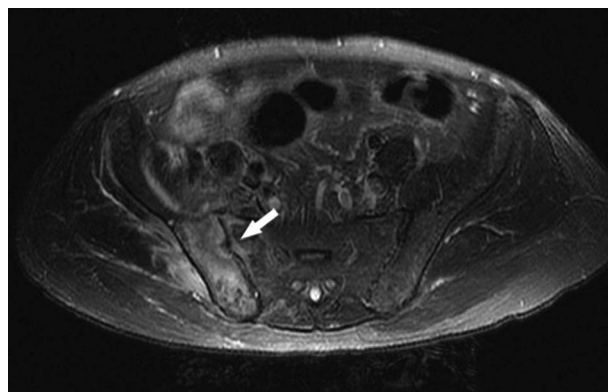


Figure 2 Axial fat-suppressed T2-weighted MRI showed adjacent bone marrow oedema in the right iliac bone (arrow) and right portion of the sacrum. It also shows surrounding muscle swelling at both the anterior and posterior aspects.

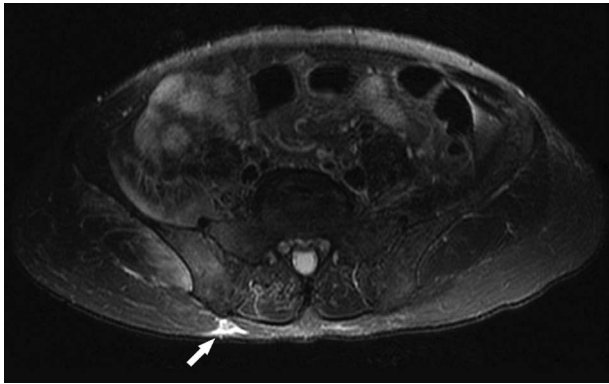


Figure 3 Axial fat-suppressed T2-weighted MRI showed subcutaneous oedema and interfascial plane swelling at the right gluteal region, as well as a subcutaneous fibrogranulation tract (arrow) that corresponded to the acupuncture insertion tract.

level of C-reactive protein, which tends to increase with an increased erythrocyte sedimentation rate, may be a relatively sensitive marker of ISI.¹⁻⁸ However, in our case the white blood cell count was normal and the C-reactive protein level only mildly raised, and thus the erythrocyte sedimentation rate was not determined. Although the laboratory tests initially increased the difficulty of diagnosis, determination of the causative organism from blood culture finally led the diagnosis.

Gram-positive cocci, predominantly *S aureus*, have been reported to be the most frequently cultured organisms in cases of ISI.¹⁻³ Less than 20% of previously reported cases were caused by Gram-negative bacillus, of which *Pseudomonas aeruginosa* and *Escherichia coli* were the most commonly isolated.¹⁻³ In the diagnosis of ISI, invasive procedures are a last resort, as collection of synovial fluid over the sacroiliac joint is difficult. In patients whose blood culture results fail to disclose a causative pathogen, fluoroscopic guided fine-needle aspiration or open biopsy of the sacroiliac joint can be used to help in pathogen identification.⁸ The blood culture in this case yielded *S aureus*, which led to correlation of the patient's hip pain after acupuncture with the final diagnosis.

Having evolved to become the most useful imaging method in evaluating early and subsequent changes involving the sacroiliac joint and invasion of adjacent structures,^{3-7,9} MRI, rather than technetium bone scanning, has become the preferred tool in the diagnosis of ISI.⁹ ISI is suspected when focused MRI shows low signal intensity on T1-weighted images and high signal intensity on T2-weighted images.¹ In our patient, MRI showed mild expansion of the infected sacroiliac joint space along with effusion and bone marrow oedema on the joint surfaces, indicating active inflammation.⁹

Previous research has found that intravenous antibiotic therapy and aspiration drainage result in better

outcomes in cases of joint infection.¹ Administration of empirical antibiotics for sacroiliitis should first consider covering *S aureus* until the specific organism(s) and the antimicrobial sensitivities have been identified. Although most joint infections can be drained with closed needle aspiration, aspiration of the sacroiliac joint is difficult because the joint is deeply seated and the procedure is technically challenging.¹⁰ Thus, surgical intervention is rarely considered initially in the treatment of sacroiliitis. However, when antibiotic therapy fails to produce a response, or for patients with abscess formation, bone involvement and necrosis, or for those with proven osteomyelitis and for whom joint drainage cannot be obtained by needle aspiration or arthroscopy, open surgical treatment may be necessary.²⁻¹⁰

CONCLUSION

This report describes the diagnosis and treatment of a patient who developed *S aureus*-related ISI after undergoing acupuncture for the treatment of chronic pain. The experience of this patient indicates that clinicians should take a history of acupuncture use when evaluating patients presenting with fever of unknown origin and/or bacteraemia, and consider ISI when evaluating patients with hip pain and infectious signs after acupuncture or other possible causes of infection. The possible association between ISI and acupuncture identified in this study indicates the importance of performing clinically clean procedures to prevent septic complications when such treatment is used.

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Contributors K-MY performed the clinical diagnosis and supervised the manuscript drafting. Y-CT drafted the manuscript, reviewed the literature and assisted in direct management of the patient. Y-SY and S-KC reviewed the acupuncture-related articles and were involved in discussion. Y-CW read the image, related articles and described the image findings. T-YL revised and edited the manuscript. All authors read and approved the final manuscript.

Competing interests None.

Patient consent Obtained.

Ethics approval Ethics committee of the Tri-Service General Hospital, National Defense Medical Center.

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